

CLAIMS:

1. A router method of alleviating congestion when processing packets transmitted by computer systems having a congestion notification capability, comprising:

dropping packets transmitted by said computer systems after said notification.

2. The method according to claim 1, wherein said step of notifying further comprises the step of marking packets transmitted by said computer systems to indicate that said router is congested.

3. The method according to claim 1, further comprising the step of determining whether said computer systems have received said notification utilizing a table which includes a listing of computer system identifiers.

4. The method according to claim 1, further comprising the steps of:

receiving, utilizing said router, a packet transmitted by said first computer system;

determining, utilizing said router, whether said packet was transmitted subsequently to a receipt by said first computer system of said marked packet;

in response to a determination that said packet was transmitted by said first computer system subsequently to

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said receipt of said marked packet, dropping, by said router, said packet; and

in response to a determination that said packet was not transmitted subsequently to said receipt of said
5 marked packet, forwarding, by said router, said packet.

5. The method according to claim 4, wherein the step of determining whether said packet was transmitted subsequently to said receipt of said marked packet
10 further comprises the steps:

in response to each receipt by said router of a packet transmitted by said first computer system, determining whether an identifier which identifies a connection between said first and second computer system
15 is stored in a list of identifiers within said router; and

in response to a determination that said identifier which identifies said connection is stored in said list, determining that said packet was transmitted subsequently
20 to said receipt of said marked packet.

6. The method according to claim 5, further comprising the step of in response to a determination that said identifier which identifies said connection is not stored
25 in said list, determining that said packet was not transmitted subsequently to said receipt of said marked packet and storing said identifier in said list within said router.

30 7. The method according to claim 6, further comprising the step of including with said identifier a time stamp

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indicating a current time said packet was received by said router.

8. The method according to claim 7, wherein the step of
5 determining whether said packet was transmitted subsequently to said receipt of said marked packet further comprises the steps:

in response to each receipt by said router of a second packet transmitted by said first computer system,
10 determining whether said identifier is stored in said list; and

in response to a determination that said identifier which identifies said connection is included in said list, determining that said second packet was transmitted
15 subsequently to said receipt of said marked packet.

9. The method according to claim 8, wherein the step of
in response to a determination that said identifier which identifies said connection is stored in said list,
20 determining that said packet was transmitted subsequently to said receipt of said marked packet, further comprises the steps of:

in response to a receipt of said second packet, calculating a minimum time;
25 determining whether a current time is greater than said minimum time;

in response to a determination that said current time is greater than said minimum time, determining that said second packet was transmitted subsequently to said
30 receipt of said marked packet; and

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in response to a determination that said current time is equal to or than said minimum time, determining that said second packet was not transmitted subsequently to said receipt of said marked packet.

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10. The method according to claim 9, further comprising the step of calculating said minimum time by adding said time stamp to a round trip time, said round trip time being a time required for a packet to travel from said
10 first computer system to said second computer system and back to said first computer system.

11. A computer program product for alleviating router congestion when said router is processing packets
15 transmitted by computer systems having a congestion notification capability, comprising:

instruction means for notifying said computer systems that said router is congested; and

instruction means for dropping packets transmitted
20 by said computer systems after said notification.

12. The product according to claim 11, wherein said instruction means for notifying further comprising instruction means for marking packets transmitted by said
25 computer systems to indicate that said router is congested.

13. The product according to claim 11, further comprising the instruction means for determining whether
30 said computer systems have received said notification

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utilizing a table which includes a listing of computer system identifiers.

14. The product according to claim 11, further
5 comprising:

instruction means for receiving, utilizing said router, a packet transmitted by said first computer system;

instruction means for determining, utilizing said
10 router, whether said packet was transmitted subsequently to a receipt by said first computer system of said marked packet;

in response to a determination that said packet was transmitted by said first computer system subsequently to
15 said receipt of said marked packet, instruction means for dropping, by said router, said packet; and

in response to a determination that said packet was not transmitted subsequently to said receipt of said marked packet, instruction means for forwarding, by said
20 router, said packet.

15. The product according to claim 14, wherein said instruction means for determining whether said packet was transmitted subsequently to said receipt of said marked
25 packet further comprises:

in response to each receipt by said router of a packet transmitted by said first computer system, instruction means for determining whether an identifier which identifies a connection between said first and
30 second computer system is stored in a list of identifiers within said router; and

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in response to a determination that said identifier which identifies said connection is stored in said list, instruction means for determining that said packet was transmitted subsequently to said receipt of said marked
5 packet.

16. The product according to claim 15, further comprising in response to a determination that said identifier which identifies said connection is not stored
10 in said list, instruction means for determining that said packet was not transmitted subsequently to said receipt of said marked packet and storing said identifier in said list within said router.

15 17. The product according to claim 16, further comprising instruction means for including with said identifier a time stamp indicating a current time said packet was received by said router.

20 18. The product according to claim 17, wherein said instruction means for determining whether said packet was transmitted subsequently to said receipt of said marked packet further comprises:

in response to each receipt by said router of a
25 second packet transmitted by said first computer system, instruction means for determining whether said identifier is stored in said list; and

in response to a determination that said identifier which identifies said connection is included in said

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list, instruction means for determining that said second packet was transmitted subsequently to said receipt of said marked packet.

5 19. The product according to claim 18, wherein said instruction means for in response to a determination that said identifier which identifies said connection is stored in said list, determining that said packet was transmitted subsequently to said receipt of said marked
10 packet, further comprises:

in response to a receipt of said second packet, instruction means for calculating a minimum time;

instruction means for determining whether a current time is greater than said minimum time;

15 in response to a determination that said current time is greater than said minimum time, instruction means for determining that said second packet was transmitted subsequently to said receipt of said marked packet; and

in response to a determination that said current
20 time is equal to or than said minimum time, instruction means for determining that said second packet was not transmitted subsequently to said receipt of said marked packet.

25 20. The product according to claim 19, further comprising instruction means for calculating said minimum time by adding said time stamp to a round trip time, said round trip time being a time required for a packet to travel from said first computer system to said second
30 computer system and back to said first computer system.

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21. A router system for alleviating congestion when processing packets transmitted by computer systems having a congestion notification capability, comprising:

5 said router for notifying said computer systems that said router is congested, and

 said router for dropping packets transmitted by said computer systems after said notification.

10 22. The system according to claim 21, further comprising said router for marking packets transmitted by said computer systems to indicate that said router is congested.

15 23. The system according to claim 21, further comprising said router for determining whether said computer systems have received said notification utilizing a table which includes a listing of computer system identifiers.

20 24. The system according to claim 21, further comprising:

 said router for receiving a packet transmitted by said first computer system;

25 said router for determining whether said packet was transmitted subsequently to a receipt by said first computer system of said marked packet;

 in response to a determination that said packet was transmitted by said first computer system subsequently to said receipt of said marked packet, said router for dropping said packet; and

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in response to a determination that said packet was not transmitted subsequently to said receipt of said marked packet, said router for forwarding said packet.

- 5 25. The system according to claim 24, wherein said router for determining whether said packet was transmitted subsequently to said receipt of said marked packet further comprises:

10 in response to each receipt by said router of a packet transmitted by said first computer system, said router for determining whether an identifier which identifies a connection between said first and second computer system is stored in a list of identifiers within said router; and

- 15 in response to a determination that said identifier which identifies said connection is stored in said list, said router for determining that said packet was transmitted subsequently to said receipt of said marked packet.

- 20 26. The system according to claim 24, further comprising in response to a determination that said identifier which identifies said connection is not stored in said list, said router for determining that said packet was not transmitted subsequently to said receipt of said marked packet and storing said identifier in said list within said router.

- 25 27. The system according to claim 26, further comprising
30 said router for including with said identifier a time

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stamp indicating a current time said packet was received by said router.

28. The system according to claim 27, wherein said
5 router for determining whether said packet was
transmitted subsequently to said receipt of said marked
packet further comprises:

in response to each receipt by said router of a
second packet transmitted by said first computer system,
10 said router for determining whether said identifier is
stored in said list; and

in response to a determination that said identifier
which identifies said connection is included in said
list, said router for determining that said second packet
15 was transmitted subsequently to said receipt of said
marked packet.

29. The system according to claim 28, wherein said
router for in response to a determination that said
20 identifier which identifies said connection is stored in
said list, determining that said packet was transmitted
subsequently to said receipt of said marked packet,
further comprises:

in response to a receipt of said second packet, said
25 router for calculating a minimum time;

said router for determining whether a current time
is greater than said minimum time;

in response to a determination that said current
time is greater than said minimum time, said router for
30 determining that said second packet was transmitted
subsequently to said receipt of said marked packet; and

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in response to a determination that said current
time is equal to or than said minimum time, said router
for determining that said second packet was not
transmitted subsequently to said receipt of said marked
5 packet.

30. The system according to claim 29, further comprising
said router for calculating said minimum time by adding
said time stamp to a round trip time, said round trip
10 time being a time required for a packet to travel from
said first computer system to said second computer system
and back to said first computer system.

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